Space Weather Forecast

Issued on Saturday, 30 April 2022 at 01:17 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: G1 Minor geomagnetic storm intervals possible in first half of forecast period, but low confidence. Gradually reducing chance of Moderate-class X-ray flares (R1/R2 Radio Blackouts).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate with two low level Moderate-class flares in the past 24 hours. AR2994 is now no longer visible, having rotated to the west limb. However, it produced a Moderate flare at 29/1810UTC. In addition, the other Moderate flare came from a plage remnant of Ex-2996 in the northwest quadrant at 29/0730 UTC.

There are currently six numbered sunspots on the visible disc, with recently active AR2994 and 2993 now both no longer visible. In addition, the flare-generating plage of Ex-2996, in the northwest quadrant, remains spotless. The numbered sunspots on the visible disc are currently stable and unipolar or simple dipoles, with no notable flares produced from these groups.

A CME associated with the Moderate flare at 29/0730 UTC has been modelled, and although the bulk of the ejecta is directed away from the Sun-Earth line, there is a low chance of a passing glance early on 1st May, but this is low confidence. No other Earth-directed CMEs were observed.

Solar Wind / Geomagnetic Activity: The solar wind, as observed by DSCOVR at L1, has been elevated to slightly elevated, with a slow overall erratic decrease. The associated strength of its magnetic field was weak and stable. The important north-south component weakly variable, but was often southward orientated. Resultant geomagnetic activity was Quiet to Active (Kp 2 to 4).

Energetic Particles / Solar Radiation: No solar radiation storms were observed in the 24 hours, although there was a limited proton response following the M1 flare at 29/0730UTC from ex-2996, with a peak flux of 4,2pfu at 29/2145 UTC.

Four-Day Space Weather Forecast Summary

Solar Activity: There is a daily slight chance of further Moderate-class X-ray activity, although this is expected to wane during the second half of the forecast period, perhaps significantly so by the very end of the four days as recent active regions successively depart for the sun's far side.

Solar Wind / Geomagnetic Activity: The geomagnetic forecast carries relatively high uncertainty.

Current modelling suggests the potential glancing pass of a CME which left the Sun around 27/1450UTC early on 30th. A CME from 28 April may also catch up with this first CME to complicate its influence. A further CME associated with the M1 flare at 29/0730 UTC has been modelled, and although the bulk of the ejecta is directed away from the Sun-Earth line, there is a

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low chance of another passing glance early on 1st May, but this is low confidence.

Otherwise, the current enhanced solar winds, likely from CH78/-, are expected to gradually wane over the next few days.

There is a Slight Chance of G1/Minor Storm (Kp 5) intervals on days one and two (30 April and 1 May), should the potential CMEs pass Earth. Otherwise, geomagnetic activity should gradually taper from occasionally Unsettled conditions to generally Quiet, as coronal hole influence wanes.

Energetic Particles / Solar Radiation: Solar radiation should remain near background levels through the next four days. However, ex-2996 remains in the northwestern quadrant, and given its recent occasional flare activity remains a potential source for a proton event for the next few days, albeit with probabilities at a slight chance.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	20	1	1
Strong	G3	No	1	5	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	20	20	10	10
Very Active	R3 to R5 X	No	1	1	1	1

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Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	5	5	2	2
Very Active	**≥ S3 ***	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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